PB-247 825

INSPECTION AND MAINTENANCE PROGRAM CHECKLIST

George J. Gorman, III

Environmental Protection Agency
Philadelphia, Pennsylvania

December 1975

DISTRIBUTED BY:

NTIS

National Technical Information Service
U. S. DEPARTMENT OF COMMERCE

PB 247 825

U.S. ENVIRONMENTAL PROTECTION AGENCY

Reproduced by
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. Department of Commerce
Springfield, VA. 22151

MIDDLE ATLANTIC REGION - III 6th and Walnut Streets, Philadelphia, Pennsylvania 19106

363163

INSPECTION & MAINTENANCE PROGRAM

CHECKLIST

DECEMBER 1975

REGION III
ENVIRONMENTAL PROTECTION AGENCY

NO. 903/9-75-020

REGION III

ENVIRONMENTAL PROTECTION AGENCY

INSPECTION & MAINTENANCE PROGRAM CHECKLIST

DECEMBER 1975

GEORGE J. GORMAN III

INTRODUCTION

This document was prepared by U.S. Environmental Protection Agency, Region III as a guide for implementing an Inspection and Maintenance Program. It was developed by reviewing various laws and regulations across the United States to provide a standard set of information on the subject. One specific use is as a checklist of items for a State to consider when writing a motor vehicle emission control law. It also provides sources of information and suggested terminology and wording.

BIBLIOGRAPHIC DATA SHEET	1. Report No. EPA 903/9-75-020	2.	3. Recipient's Accession No.
4. Title and Subtitle INSPECTION & MAINTENANCE PROGRAM CHECKLIST			5. Report Date DEC 1975 6.
7. Author(s) GEORGE J. GORMAN			8. Performing Organization Rept. No.
9. Performing Organization Name and Address U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION III AIR & HAZARDOUS MATERIALS DIVISION 6th and Walnut Streets Philadelphia, Pennsylvania 19106			10. Project/Task/Work Unit No. 11. Contract/Grant No.
12. Sponsoring Organization Name and Address			13. Type of Report & Period Covered FINAL 14.

15. Supplementary Notes

16. Abstracts

This document was prepared as a guide/checklist for implementing and inspection and maintenance program. It was developed by reviewing various laws and regulations across the United States to provide a standard set of information on the subject. One specific use is as a checklist of items for a state to consider when writing a motor vehicle emission control law. It also provides sources of information and suggested terminology and wording.

17. Key Words and Document Analysis. 17a. Descriptors

EMISSION
EXHAUST GASES
INSPECTION
LEGISLATION
MAINTENANCE
MOTOR VEHICLES

17b. Identifiers/Open-Ended Terms

17c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report)	21. No. of Pages
RELEASE UNLIMITED	UNCLASSIFIED	24
	20. Security Class (This Page) UNCLASSIFIED	22. Price 3.50

1. Definition of Terms:

The following words and terms when used in this Subchapter shall have the following meanings, unless the context clearly indicates otherwise:

(a) "Approved exhaust gas analytical system" means a device for sensing the amount of air contaminants in the exhaust emissions of a motor vehicle, For purposes of this Subchapter this shall mean analyzing devices of the nondispersive infrared type sensitized to measure carbon monoxide at the 4.74 micron band expressed as percent carbon monoxide in air and to measure hydrocarbons as hexane at the 3.41 micron band expressed as parts per million of hydrocarbons (hexane) in air. The device shall be of a design meeting "SPECIFICATIONS FOR EXHAUST GAS ANALYTICAL SYSTEM" on file with the State Commissioner of Environmental Protection and approved for use in accordance with the manufacturer's recommended procedures for calibration and maintenance.

(b) "Certificate of Inspection" means a serially numbered, adhesive sticker, device, or symbol, as may be prescribed by the air pollution control commission, indicating a vehicle has passed emissions inspection under this article.

(c) "Emissions inspection station permit" means a certificate issued by the division authorizing the holder to perform vehicular inspections pursuant to this article.

(d) "Fleet emissions inspection station" means any inspection facility operated under a permit issued to a qualified fleet owner or lessee of vehicles as authorized by regulation of the commission.

(e) "Inspector" means any person who performs emissions inspections.

(f) "Official emissions inspection station" means an inspection facility, other than a fleet emissions inspection station, whether established at a fixed location or as a mobile unit for use at various locations within this state, used for the purpose of conducting emissions inspections of all vehicles required to be inspected pursuant to this article.

(g) "Retrofit device" means equipment added to the mechanical features of a vehicle, or a required adjustment, connection, or disconnection of an existing item of equipment thereon, for the purpose of reducing emissions.

(h) "Carbon monoxide" a non-irritating, colorless, odorless gas at standard conditions which has the molecular form of CO.

(i) "Crankcase emissions" means substances emitted into the atmosphere from any portion of the engine crankcase ventilation or lubrication system.

(j) "Exhaust emissions" means substances emitted into the atmosphere from any opening downstream from the exhaust ports of a motor vehicle engine.

(k) "Hydrocarbons" compounds whose molecular consist of atoms of hydrogen and carbon only.

(l) "Light-duty vehicle" means any motor vehicle designed primarily for transportation of persons or property and registered at less than 6000 pounds GVW.

(m) "Medium-duty vehicle"means any motor vehicle designed primarily for transportation of persons or property and registered at more than 6000 pounds GVW and less than 10,000 pounds GVW.

(n) "Heavy-duty vehicle" means any motor vehicle designed primarily for transportation of persons or property and registered at 10,000 pounds GVW or more.

(p) "Model year of vehicle" means the production period of new motor vehicles or new motor vehicle engines designated by the calendar year in which such period ends. If the manufacturer does not designate a production period, the model year with respect to such vehicles or engines shall mean the 12-month period beginning January of the year in which production begins.

(q) "New motor vehicle" means a newly-manufactured motor vehicle registered in the state, prior to delivery to the ultimate purchaser.

(r) "New motor vehicle dealer" means a sales agency, his employees, and/or agents licensed pursuant to state law to sell new motor vehicles.

(s) "Person" means corporations, companies, associations, societies, firms, partnerships and joint stock companies as well as individuals, and shall also include all political subdivisions of this State or any agencies or instrumentalities thereof.

(t) "Pre-delivery checklist" means a schedule of items and procedures which a new motor vehicle dealer is required or requested by a manufacturer to check or follow prior to delivery of a new motor vehicle to the ultimate purchaser.

(u) "Smoke" means small gasborne and airborne particles, exclusive of water vapor, arising from a process of combustion in sufficient number to be observable.

(v) "Ultimate purchaser" means any person, other than a motor vehicle dealer purchasing in his capacity as a motor vehicle who in good faith purchases a motor vehicle for purposes other than for resale as a motor vehicle dealer.

(w) "Air contaminant" means fumes, smoke, particulate matter, vapor, gas, or any combination thereof, but not including water vapor or stream condensate.

(x) "Air contamination source" means any source whatsoever at, from, or by reason of which there is emitted or discharged into the atmosphere any air contaminant.

(y) "Air pollution control authority" means the division, or any person or agency given authority by the division, or a local governmental unit duly authorized with respect to air pollution control.

(z) "Ambient air" is the surrounding or outside air.

(aa) "Commission" means the air pollution control commission created by State law.

(bb) "Division" means the division of administration of the department of health.

(cc) "Emission" means the discharge or release into the atmosphere of one or more air contaminants.

(dd) "Emission control regulation" means and includes any standard promulgated by regulation which is applicable to all air contamination sources within a specified area and which prohibits or establishes permissable limits for specific types of emissions in such area, and also any regulation which by its terms is applicable to a specified type of facility, process, or activity for the purpose of controlling the extent, degree, or nature of contamination emitted from such type of facility, process, or activity, and also any regulation adopted for the purpose of preventing or minimizing emission of any air contaminant in potentially dangerous quantities.

(ee) "Indirect air contamination source" means any facility, building, structure, or installation, or any combination thereof, which can reasonably be expected to cause or induce substantial mobile source activity which results in emissions of air contaminants which might reasonably be expected to interfere with the attainment and maintenance of federal ambient air standards.

(ff) "Local air pollution law" means any law, ordinance, resolution, code, rule or regulation adopted by the governing body of any city, town, county, or city and county, pertaining to the prevention, control and abatement of air pollution.

(gg) "Motor vehicle" means any self-propelled vehicle which is designed primarily for travel on the public highways and which is generally and commonly used to transport persons and property over the public highways.

(hh) "Accuracy" The degree by which an instrument is able to determine the true concentration of a pollutant of interest in the exhaust gas sampled from a spark ignition engine.

(ii) "Calibration gases" A blend of hydrocarbon and carbon monoxide gases using nitrogen as a carrier gas. The gas blender shall certify that the labeled volumes are within ± 2% of the true value, the true value being traceable to National Bureau of Standards (NBS) certified gases.

(jj) "Drift" The amount of meter reading change over a period of time. Zero Drift refers to change of zero reading. Span Drift refers to a change in reading of a calibration point on the upper half of the scale. The calibration point is to be established by reading a calibration gas of known concentration.

(kk) "Hangup" Hydrocarbons which cling to the surface of the sampling and analyzer systems in contact with the gas sample stream which causes an erroneous indication of hydrocarbons in the measured value.

(ll) "Instrument" The complete system which samples and determines the concentration of the pollutant gas. The instrument includes the sample handling system, the analyzer, and the enclosure cabinet.

(mm) "Intermediate calibration" Calibration by precision gases; used for intermediate calibration points to establish the instrument calibration curve.

(nn) "Precision gases" A blend of hydrocarbons and carbon monoxide gases using nitrogen as a carrier gas. True concentrations are certified by the gas blender to be within ± 1% of the label concentration. The gas blender shall certify that the labeled volumes are within ± 1% of the true value, the true value being traceable to National Bureau of Standards (NBS) certified gases.

(pp) "Repeatability" The instrument's capability to provide the same value for successive measurements of the same sample.

(qq) "Response Time" The period of time required by an instrument to provide meaningful results after a step change in gas concentration level initiated at the tailpipe sample probe. Response time is defined as the time to achieve 90% of the change in the measured concentration of a pollutant introduced at the tailpipe sample probe.

(rr) "Span gas" A calibration of precision gas which produces the highest concentration calibration point for the measurement scale being used, usually greater than 80% of full scale.

(ss) "Standardized instrument" An instrument calibrated and accepted as the Standard and used for comparison purposes. All other instruments are compared in performance to the standardized instrument.

(tt) "Zero gas" Air or nitrogen which has a specified high purity free of contaminated gases of interest.

(uu) "Reconstructed Motor Vehicle." -- Any motor vehicle which shall have been assembled or constructed largely by means of essential parts, new or used, derived from other motor vehicles or makes of motor vehicles of various names, models, and types, or which if originally otherwise constructed, shall have been materially altered by the removal of essential parts, or by the addition or substitution of essential parts, new or used, derived from other motor vehicles or makes of motor vehicles.

2. General Discussion: Give a brief explanation of what the law is intended to do i.e.,

LEGISLATIVE DECLARATION.--In order to foster the health, welfare, convenience, and comfort of the inhabitants of the State of Colorado, and to facilitate the enjoyment of nature, scenery, and other resources of the state, it is hereby declared to be the policy of the state to achieve the maximum practical degree of air purity in every portion of the state. To that end, it is the purpose of this article to require the use of all available practical methods to reduce, prevent, and control air pollution throughout the entire state of Colorado, and to maintain a cooperative program between the state and local units of government. It is further declared that the prevention, abatement, and control of air pollution in each portion of the entire state are matters of statewide concern and are affected with apublic interest and that the provisions of this article are enacted in the exercise of the police powers of this state for the purpose of protecting the health, peace, safety, and general welfare of the people of this state.

3. Emission Standards: Specify the emission standards you want to meet; i.e.,

Model Year of Vehicle	CO(%)	HC(ppm)
Up to and including 1967	10.0	1600
1968-1969	8.0	800
1970-1974	6.0	600
1975 & Later		

4. Coverage: Give specific coverage of the law; i.e.,

. Light, Medium and Heavy-Duty Vehicles

. Model Years

. In-Use Vehicles

. Dealer-Prepared Vehicles

New Motor Vehicle Dealer Inspection Compliance Standards:

(a) Any light-duty, gasoline-fueled new motor vehicle subject to inspection by any new motor vehicle dealer in accordance with regulations promulgated by the New Jersey Division of Motor Vehicles shall, prior to delivery by the new motor vehicle dealer to the ultimate purchaser, conform to the emission specifications presented by the manufacturer and/or such specifications as may be prescribed by the manufacturer in the new motor vehicle pre-delivery checklist to assure proper functioning of emission control devices.

(b) Whenever emission specifications are not prescribed, the inspection standards as set forth in this Chapter shall apply to such motor vehicles.

5. Inspection Procedures: Give specific procedures; i.e.

A. Idle Mode:

Inspection Procedures - Step 1: With vehicle in neutral gear, all accessories off, hand brake secured and engine running at normal operating temperature, accelerate engine to approximately 2,500 r.p.m. for a period of about 20 seconds and observe for visible smoke in the exhaust emissions and crankcase emissions.

Step 2: Check exhaust gas analytical system for zero and span settings and calibrate if HC or CO meters do not read within one scale division of the specified span check values. This procedure shall be conducted before each inspection.

Step 3: With the engine running at normal idle speed and at normal operating temperature, insert sampling probe of exhaust gas analytical system into the engine exhaust outlet. Adjust idle mixture screw on carburetor to obtain minimum feasible hydrocarbon emissions. The highest levels measured as percent carbon monoxide and parts per million hydrocarbons in the exhaust gas shall be the inspection test result. Motor vehicles equipped with dual exhaust systems shall be inspected from each exhaust outlet, and the higher of the two measurements shall be the inspection test result.

Step 4: Any light, medium or heavy-duty gasoline-fueled motor vehicle which is subject to inspection by the Division of Motor Vehicles in accordance with said inspection, shall not emit visible smoke in the exhaust emissions or in the crankcase emissions when using the proscribed inspection test procedure.

6. Tampering: Explain tampering as far as the emission control equipment is concerned; i.e. ,

AUTOMOBILE AIR POLLUTION CONTROL DEVICES--TAMPERING--OPERATION OF VEHICLE.---(1) No person shall knowingly disconnect, deactivate, or otherwise render inoperable any air pollution control device which has been installed by the manufacturer of any automobile of a model year of 1968 or later.

(2) No person shall operate on any highway in this state any automobile described in subsection (1) of this

section knowing that any air pollution control device installed on such automobile has been disconnected, deactivated, or otherwise rendered inoperable.

(3) Any person who violates any provision of this section shall be guilty of a misdemeanor, and upon conviction thereof shall be punished by a fine of not less than ten dollars nor more than one hundred dollars, or by imprisonment in the county jail for not more than ten days, or by both such fine and imprisonment.

7. Enforcement: Identify an enforcing agency, such as State Police, with authority and responsibility to enforce the emission law. A program of enforcement should be identified to ensure compliance.

8. Funding: Identify the sources and amounts of funding for the program.

9. Periodicty: Annual inspections for emissions preferable to coincide with the state's inspection program, if it exists.

10. Emission Inspection Fees: This is a critical matter and should be controlled to some degree to prevent possible "ripoffs"; i.e.,

Emission inspection fees - composition and disposition.

(1) The state shall determine and may alter, in accordanc with this section, the fees charged for making emission inspections, which fee shall not exceed ( ) dollars per inspection. Said fee shall be due and payable for the emissions inspection of every vehicle inspected pursuant to this article.

(2) The fees charged for emissions inspections under this article shall be determined by the state and shall be uniform as applied to the vehicles affected.

(3) The owner of any vehicle which has been inspected at an official emissions inspection station and did not pass the emissions inspection and has thereafter been repaired or readjusted has the right, within thirty calendar days from the date of initial inspection, but not thereafter, to return such vehicle to the inspection station who made the initial inspection for one reinspection without added charge. In the event of noncompliance after the reinspection, the vehicle owner may request, pursuant to a hearing to suspend or modify the enforcement of the emission inspection emission control regulation with regard to his vehicle.

11. Effective Date: It is important to identify the implementation dates of the emission inspection program, also a proposed schedule could be as follows:

COVERAGE	PHASE	INSPECTION	MAINTENANCE	EFFECTIVE DATE
State-owned Vehicles only	I	Mandatory	Mandatory	
All Vehicles in State	II	Mandatory	Voluntary	
" "	III	Mandatory	Mandatory	

12. Variances: A variance procedure should be included for hardship situations where it is not feasible to repair a failed vehicle; i.e.,

(a) Whenever the Director, Division of Motor Vehicles, has reason to believe that any model year of vehicle (or classification of light-medium or heavy-duty gasoline-fueled vehicles) up to and including 1967 cannot comply with the emission standards as set forth in Section _____ he shall so advise the Commissioner, Department of

Environmental Protection, stating the manufacturer, model, year and classification of such vehicles. After consultation with the Commissioner, Department of Environmental Protection, the Director Division of Motor Vehicles, may waive any inspection standards for such motor vehicles.

13. Exceptions: Identify motor vehicles not included under this law; i.e.,

The provisions of this Chapter shall not apply to motorcycles or to motor vehicles with an engine displacement of less than 50 cubic inches, antique vehicles, etc.

14. Smoke test: Inspect emission control system for completeness also check for visible smoke from the exhaust. Identify standards.

15. Certification: Include procedures for certification and testing of emission mechanics, inspectors, instructors, schools, exhaust gas analyzers, inspection stations and span gases for calibration of exhaust gas analyzers; i.e.,

a) Emission mechanics, inspectors and instructors could be certified using the National Institute for Automobile Service Excellence (AIASE) tests already developed.

b) Schools for certifying emission control mechanics and inspection stations exist in many states.

c) Exhaust gas analyzers could be certified similar to attached procedures developed by Pennsylvania, (Pa. Bulletin VOL5, No. 13, March 29, 1975).

d) Span gases could be certified in accordance with the National Bureau of Standards Reference gases specification.

(a) That the division, with whatever assistance it may request from the manufacturer, shall test emission control devices on vehicles for which a particular device is proposed when it can be determined by the division that the device will likely meet the commission standards prescribed for hydrocarbons, carbon monoxide, and nitrogen oxides;

(b) That the retrofit device or system shall not in its operation or function cause the emission into the atmosphere of any toxic substances which are not emitted in the operation of such vehicle or vehicle engine absent such device or system, except as specifically permitted by regulations;

(c) That the retrofit device or system shall not in its operation, function, or malfunction result in any unsafe condition or act to create a public nuisance endangering the vehicle, its occupant, or other persons or property;

(d) That the manufacturer of any retrofit device or system shall cause such device or system to be tested in accordance with good engineering practices on each model of vehicles for which it is proposed in order to ascertain that the device or system has an expected useful life of at least fifty thousand miles in the Colorado environment;

(e) That the initial cost, including installation, of an accredited retrofit device or system shall not exceed a ceiling cost of forty-five dollars for installation on 1968 and later model-year vehicles, said ceiling cost to be adjusted on July 1 of each year relative to the annual increase in the wholesale price index using July 1, 1975, as the baseline;

(f) That any accredited retrofit device or system shall not normally require maintenance more than once each twelve thousand miles;

16. Training Programs: Emission repair mechanics, inspectors and instructors should complete a training course and pass qualification tests; i.e.,

Training Programs. (1) Inspectors, emission repair mechanics, and instructors shall complete a training course and pass qualification tests as developed and approved by the commission relating to the operation of a state emissions inspection program under this article. The commission may waive the requirement for completion of training courses under such circumstances as the commission deems appropriate. Only inspectors, mechanics and instructors passing said qualification tests shall perform emissions inspections.

(2) The division is directed on a continuing basis, as authorized and budgeted by the general assembly, to make studies and conduct pilot and testing programs for the purpose of developing, implementing, and refining vehicle emission control programs in this state.

17. Retrofit Devices: If these devices are used then the same controls, procedures, etc. would be used that are used on vehicles that have them installed as regular equipment; i.e.,

Retrofit devices: (1)(a) The commission shall adopt regulations governing the mandatory installation of accredited retrofit devices. The regulations shall include a timetable for the mandatory installation of such emission control devices on all vehicles of the model year 1968 and subsequent years registered or garaged in the state, including vehicles owned or operated by governmental entites. The installation cycle shall commence on and be completed by, or such later time as shall

be prescribed by the commission. The time schedules for retrofit installation and those for initial vehicle emission inspections required under this article shall be coordinated.

(b) The commission may exempt such vehicles for which a device has not been accredited or when it determines that retrofit installation is not technologically or economically feasible, but only during such time as the condition which warrants exemption exists.

(c) The commission shall consider, in promulgating rules and regulations, the adverse effect of said rules and regulations, the adverse effect of said rules and regulations upon gasoline mileage, performance, or other factors as to any make, model, or class of motor vehicles, as well as the public benefit in reducing air pollution. The commission may exempt from regulations any make or model of vehicle as to which either gas mileage, performance, or other factor would be adversely affected in a significant manner by said control measures without corresponding public benefit in controlling air pollution.

(3) for the purposes of rapidly encouraging the development, manufacture, installation, and marketing of retrofit vehicle emission control devices, the commission shall promptly establish criteria for the evaluation by the division of the effectiveness of vehicle pollution control devices and to provide needed criteria to assist manufacturers in completing engineering programs for emission control devices based on high altitude operation of vehicles in Colorado

(4) In establishing the criteria for accreditation of a retrofit or other ex haust emission control device, the commission shall include, but shall not limit the criteria to, the following:

(g) That the manufacturer and seller of an accredited retrofit device or system shall include with the sale of such device or system instructions setting forth what steps the purchaser should take to maintain such device or system in proper working order and what steps the purchaser should take to minimize any adverse effects caused by the retrofit or system when operated outside of Colorado;

(h) That any manufacturer shall agree, as a condition of accreditation by the division, that until there are two or more accredited retrofit devices or systems for sale to the public suitable for installation on vehicles of the same classification and capable of controlling any one or more of the pollutants set forth in subsection (4)(a) of this section, the manufacturer shall either enter into such cross-licensing or other agreements as the commission determines necessary to ensure adequate competition among manufacturers to protect the public interest or permit the commission to determine the fair and reasonable retail price of such device or system, taking into account the cost of manufacturing the device or system and other costs; except that such price shall not exceed forty-five dollars including installation, subject to adjustments made according to the wholesale price index provisions above;

(i) The adequacy of methods of distribution, installation, and maintenance training, finanaicial responsibility, and other factors affedting economic and other interests of the public shall be evaluated by the commission and determined to be satisfactory to protect the motorist.

(5) After the establishment of such criteria by the commission, the division shall select vehicle pollution control devices for evaluation testing. The state, at its own expense, shall accredit the devices of two manufacturers selected for state testing according to criteria approved by the commission. Other device manufacturers may have their devices accredited if the manufacturers can show that their devices are of equal or greater effectiveness in reducing vehicle emissions than those accredited by the state and if the cost of testing is borne by the manufacturer. No device manufacturer shall have market accredited devices needed to service at least eighty percent of 1968 through 1974 model-year vehicles.

(6) The commission shall also establish a program prescribing criteria for certification by the division of exhaust gas sampling instruments and emission control device installations stations. No vehicle emission control device may be accredited by the division unless it meets the emission reductions and other rules prescribed by the commission.

18. Type of Program: Specify whether the State has a private garage system, state franchised system or state-lane system.

19. Engine Replacement: If a reconstructed motor vehicle has an engine installed which is different from original equipment, the emission standards for the newly installed engine shall apply to the vehicle.